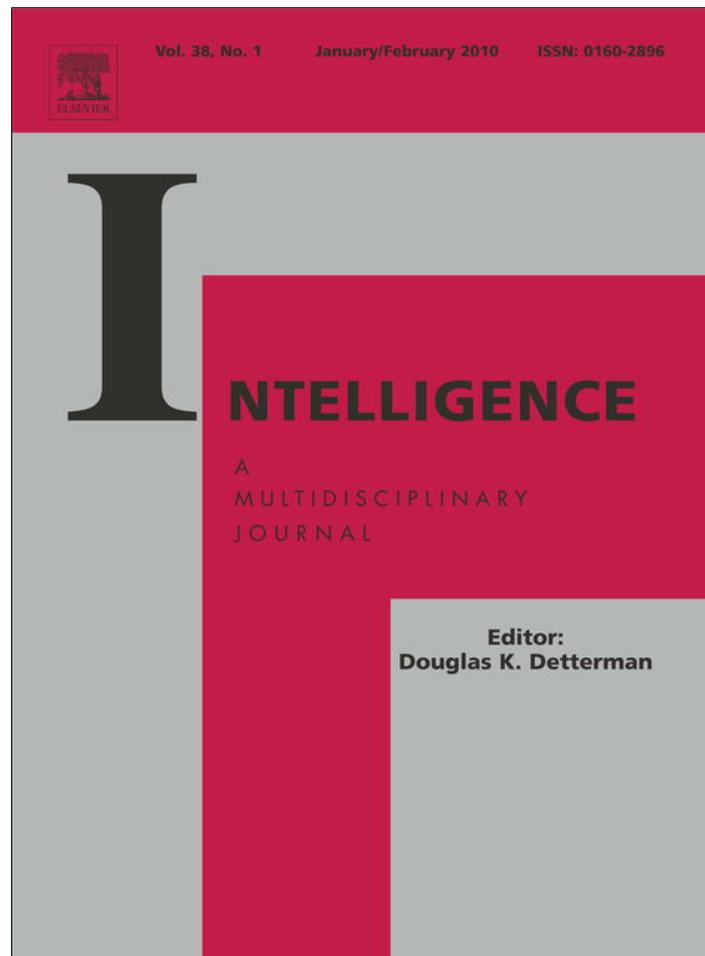


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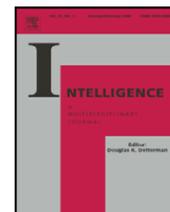
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## Intelligence



## Social status, cognitive ability, and educational attainment as predictors of liberal social attitudes and political trust

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### ARTICLE INFO

#### Article history:

Received 4 February 2009

Received in revised form 28 August 2009

Accepted 11 September 2009

Available online 8 October 2009

#### Keywords:

Liberal social attitudes

Political trust

Social status

Intelligence

Education

Gender

### ABSTRACT

We examined the prospective associations between family socio-economic background, childhood intelligence (*g*) at age 11, educational and occupational attainment, and social attitudes at age 33 in a large ( $N = 8804$ ), representative sample of the British population born in 1958. Structural equation Modeling identified a latent trait of 'liberal social attitudes' underlying attitude factors that are antiracist, socially liberal, and in support of gender equality. Another attitude factor—'political trust'—was relatively independent from the latent attitude trait and has somewhat different pathways in relation to the other variables included in the analysis. There was a direct association between higher *g* at age 11 and more liberal social attitudes and political trust at age 33. For both men and women the association between *g* and liberal social attitudes was partly mediated via educational qualifications, and to a much lesser extent via adult occupational attainment. For women the association between *g* and political trust was partly mediated through both educational qualification and occupational attainment, and for men it was mediated mainly via occupational attainment. Men and women who had higher educational qualifications and higher occupational status tend to be more socially liberal and more trusting of the democratic political system. In terms of socio-economic background, people from less privileged families showed less political trust, but did not differ much in liberal social attitudes from those born into relatively more privileged circumstances. This study shows that social background, cognitive ability, education, and own social status influence perceptions of society.

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Increased globalisation and uncertainty about economic and social development has led to heightened concerns about social cohesion, tolerance, and civic co-operation (Giddens and Diamond, 2005; Green et al., 2006; Putnam, 2000). Since the work of Adorno et al. (1950) much effort has been made to understand the determinants of social attitudes and political orientations. Various studies examining the dimensions and structures of social attitudes have focused on the liberalism–conservatism distinction (e.g.; Jost et al., 2003; Jost, 2006; Saucier, 2000), political views and trust (e.g. Bynner et al., 2003; Citrin & Muste, 1999; Dalton, 2004; 2005;

Inglehart, 1997; Wiggins & Bynner, 1993), and human values (e.g. Schwartz & Boehnke, 2004). It has been shown that higher cognitive ability tends to be positively correlated with liberalism and negatively correlated with conservatism (Deary et al., 2008a; Jost et al., 2003; Kroth et al., 2006; McCrae, 1996; Saucier, 2000; Stankov, 2007), and is associated with endorsement of alternatives to the major political parties, such as a preference for the Liberal or Green party in the UK (Deary et al., 2008b).

Among the social factors with which cognitive ability test scores are correlated, better educated individuals, those in professional occupations and higher income groups have been reported to hold more liberal views (Hastie, 2007; Pascarella & Terenzini, 1991; Paterson, 2008; Stubager, 2008)

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and be more trusting (Inglehart, 1999; Leigh, 2006; Nie et al., 1996). Some studies examined the association between social class and political views. For example, Furnham and Heaven (1988) tested the hypothesis of 'cross-voting,' of H. J. Eysenck (1977) which suggests that many middle-class people are conservative in their economic beliefs but liberal in their general social attitudes. Results did not support the hypothesis, showing that conservative economic beliefs were associated with conservative social attitudes and political beliefs.

Regarding gender differences in social attitudes there are mixed results, showing women to be either more trusting than men (Glaeser et al., 2000; Patterson, 1999), or less trusting (Leigh, 2006). There is also evidence to suggest that women are more likely than men to participate in society through membership in organizations and making use of their right to vote (Paterson, 2008; Schoon, 2007).

Most studies in the area have been cross-sectional and few have addressed the role of life-course experiences in influencing social attitudes in different social contexts. (Deary et al. 2008a) examined the prospective association between social background, general intelligence (*g*) at age 10, and liberal, non-traditional social attitudes at age 30 in a large, representative sample of the British population born in 1970. They identified a general latent trait underlying attitudes that are antiracist, pro-working women, socially liberal, and trusting in the democratic political system. Their study showed a strong association between higher *g* at age 10 and more liberal attitudes at age 30. Men and women in this sample showed similar results. The effect of *g* on social attitudes was partly mediated by education, and not at all by adult occupational social class.

This paper intends, as far as possible, to replicate the study of Deary et al. (2008a) using a similar design in a different sample of similar age. The study by Deary et al. (2008a) found a strong association between *g* and more liberal social attitudes, partly mediated by educational qualifications. The mediating processes were however slightly different for indicators of non-traditional liberal attitudes and of political trust, suggesting that political trust (unlike non-traditional liberal attitudes) is also influenced by occupational social status, including that of the proband and the father. The paper by Deary et al. introduced the study of social attitudes as a major, novel field of adult human activity related to childhood intelligence differences. The aim of the present paper is to examine the processes linking social background, cognitive ability, educational and occupational attainment to social attitudes in adulthood more closely, establishing possible generalisability of the indicated pathways in a different birth cohort. Being able to replicate findings in another large-scale nationally representative sample of similar age, but born 12 years earlier, will give a better understanding of the mechanisms and processes linking childhood cognitive ability to adult functioning. The attitude scales used in the present study are almost identical to the ones used in the 1970 British Cohort Study by Deary et al., thus providing the opportunity to examine the structure and stability of social attitude formation across time and in two different samples.

First we will examine the structure of latent social liberal attitudes in the 1958 cohort, using both measurement model testing and structural equation modeling. Secondly, we investigate the pathways between childhood intelligence, educa-

tion, parental and proband's occupational social class, and social attitudes in adulthood. It is hypothesised that the determinants of social attitudes are similar across the two samples studied 12 years apart.

## 1. Method

### 1.1. Participants

The National Child Development Study 1958 is a large-scale longitudinal study of the 17,415 individuals who were born in Great Britain in a week in March 1958 (Ferri et al., 2003; Power & Elliott, 2006). The following analysis is based on data collected in 1969 when the study participants were tested for their general cognitive abilities at age 11, and data collected in 1991 when they responded to questions about their social attitudes. 16,253 cohort members were eligible to take part in the follow-up survey in 1969 when they were aged 11 years (93% of the original cohort who were alive and living in the UK). Of these 16,253, 14,134 children completed tests of cognitive ability (response = 87%). Testing took place in school, and written, informed consent was given by the parents. In 1991 at age 33 years 15,567 cohort members were eligible to take part in the follow-up survey (89% of the original cohort who were alive and living in the UK). Of these 15,567, 10,827 participants completed a questionnaire on social attitudes (response = 70%). For 8804 cohort members we have complete data on their family social background, general mental ability measured at age 11, and social attitudes assessed at age 33 years. Compared to the 8804 individuals with complete data, those individuals who did not complete the 33-year follow-up study had a lower score on the test of general mental ability (IQ-type scale equivalent = 101.9 (14.3) vs 96.6 (15.6);  $p < 0.001$ ).

### 1.2. Measures

#### 1.2.1. Mental ability

Mental ability of the 1958 cohort was assessed at school using a general ability test (Douglas, 1964) consisting of 40 verbal and 40 non-verbal items. Children were tested individually by teachers, who recorded the answers for the tests. For the verbal items, children were presented with an example set of four words that were linked either logically, semantically, or phonologically. For the non-verbal tasks, shapes or symbols were used. The children were then given another set of three words or shapes or symbols with a blank. Participants were required to select the missing item from a list of five alternatives. Scores from these two sets of tests correlate strongly with scores on an IQ-type test used for secondary school selection ( $r = 0.93$ , Douglas, 1964) suggesting a high degree of validity.

#### 1.2.2. Parental social status at birth

Parental social status at birth was measured by the Registrar General's measure of social class (RGSC). The RGSC is defined according to job status and the associated education, prestige (OPCS, 1980) or lifestyle (Marsh, 1986) and is assessed by the current or last held job. Where the father was absent, the social class (RGSC) of the mother's father was used. RGSC is coded on a six-point scale: I professional; II managerial and technical; III non-

skilled non-manual; IIIM skilled manual; IV partly skilled; and V unskilled (Leete, 1977)<sup>1</sup>. Class I is associated with the highest level of prestige or skill, and class V the lowest. For ease of interpretation the scores were reversed, so that a high score represents the highest level of prestige.

### 1.2.3. Educational attainment

At age 33, participants were asked about their highest academic or vocational qualifications. Responses are coded to the six-point scale of National Vocational Qualifications levels (NVQ) which ranges from 'none' to 'higher degree level': 1 = no qualifications; 2 = Certificate of Secondary Education Grades 2 to 5 and equivalent; 3 = O level and equivalent; 4 = A level and equivalent; 5 = postsecondary degree/diploma and equivalent; and 6 = higher post-graduate degrees and equivalent.

### 1.2.4. Occupational social status

Data on the cohort member's current occupation at age 33 was used to identify their occupational social class. If a cohort member was not currently in employment, as for example women who were not employed while caring for their family, information on the last held job was used instead (7.9% of men and 31.3% of women were not in employment at age 33). This was coded according to the six-point scale of the Registrar General's Classification of Occupations (RGSC), described above.

### 1.2.5. Social attitudes

Participants completed a 55-item self-report questionnaire about their attitudes to and views of the following: support for the work ethic, support for authority, support for traditional marital values, permissiveness about work and family, opposition to family life, political cynicism, left/right political beliefs, support for equality of the sexes, environmentalism, antiracism, learning, and information technology (Wiggins & Bynner, 1993). All of the items were accompanied by five response categories: strongly agree, agree, neither agree nor disagree, disagree, and strongly disagree.

## 2. Results

### 2.1. Principal factor analysis of the attitudes items

We used Principal Factor Analysis (PFA) to examine the structure of the attitude items administered at age 33, with squared multiple correlations for the prior communality estimates. To determine if the common factor model is appropriate, the Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy was employed. To determine the number of factors, a scree plot of the eigenvalues was displayed. Both the scree slope and the eigenvalues (greater than 1.0) suggested a model with five factors, accounting for 53% of the total variance. Then a PFA with oblimin-rotation and a five factors solution was run on the 55 item. Items that had loadings  $> .32$  were extracted. The KMO value was .88, which is satisfactory. Factor 5 did not have a coherent set of items and was un-interpretable and was

therefore not included in the analysis. The four factors included in the following analysis are:

- Factor 1: political trust. Seven items had high loadings (negative and positive) on this factor. They included “There is one law for the rich and one law for the poor” ( $-.66$ ) and “Politicians are in politics for their own benefit” ( $-.53$ ).
- Factor 2: antiracism. Five items had high loadings on this factor. They included “I wouldn't mind if a family of a different race moved next door” (.70) and “I wouldn't mind working with people from other races” (.66).
- Factor 3: social liberalism. Seven items had high loadings on this factor. They included “Give law breakers stiffer sentences” ( $-.43$ ) and “Schools should teach children to obey authority” ( $-.40$ ).
- Factor 4: gender equality. Six items had high loadings on this factor. They included “If both work full-time, man and woman should take equal share of chores” (.52) and “if a child is ill, mother should take time off work” ( $-.40$ ).

Cronbach alphas were .78 for political trust, .82 for antiracism, .65 for social liberalism, and .63 for gender equality. Both in the represent cohort and in the cohort used by Deary et al. (2008a), very similar factors could be identified. Although there were significant correlations among all four factors (see Table 1), three factors – antiracism, social liberalism, and gender equality had relatively stronger correlations, ranging from  $r = .23$  to  $r = .43$ , whereas political trust had relatively weak correlations with the other three factors, ranging from  $r = .02$  to  $r = .07$ . In the study reported by Deary et al. the factor ‘political trust’ also showed relatively small correlations with the other three factors (ranging from .06 to .16). In addition, the loadings of the factor ‘political trust’ on the overall latent attitude trait previously identified by Deary et al. (2008a) were low (.21 for men and .22 for women) compared to the other three factors which showed loadings between .32 and .55. In the following analysis, we therefore assess further the appropriateness of political trust as an indicator of a latent trait of general, liberal social attitudes.

There were also gender differences between men and women on scores of the social attitude factors. ANOVA showed that women scored significantly higher than men on three out of four factors: i.e. Political Trust ( $F(1,8799) = 52.24, p < .001$ ); Antiracism ( $F(1,8802) = 65.34, p < .001$ ); and Gender Equality ( $F(1,8802) = 188.82, p < .001$ ).

### 2.2. Structural equation Modeling of childhood intelligence and adult attitudes

All SEM analyses were carried out using the structural equation Modeling program AMOS 10 (Arbuckle, 2006). The AMOS program uses maximum likelihood estimation that can be based on incomplete data, known as the full information maximum likelihood (FIML) approach. FIML estimation is a theory based approach based on the direct maximisation of the likelihood of all the observed data, not just from cases with complete data. FIML is preferable to maximum likelihood estimation based on complete data (the listwise deletion (LD) approach) since FIML estimates will tend to show less bias and be more reliable than LD estimates even when

<sup>1</sup> The occupational categories used in the US census and other European countries are similarly based on the skills and status of different occupations (Krieger & Williams, 1997).

**Table 1**  
Pearson correlations among attitudes, education, social class, and intelligence.

Variables		Correlation									Mean male SD
		1	2	3	4	5	6	7	8	9	
1.	Political trust	–	.037	–.038	.069	.360	.284	.257	.262	.229	2.695 (.717)
2.	Antiracism	–.019	–	.225	.426	.156	.177	.179	.150	.074	3.711 (.744)
3.	Social liberalism	.015	.233	–	.244	.175	.190	.176	.169	.085	2.532 (.610)
4.	Gender equality	.044	.332	.301	–	.176	.208	.170	.147	.081	3.786 (.540)
5.	Social class (age 33)	.252	.104	.147	.226	–	.550	.428	.405	.297	3.800 (1.298)
6.	Education (age 33)	.286	.208	.155	.292	.514	–	.507	.501	.316	2.504 (1.361)
7.	Verbal scores (cognitive ability)	.278	.142	.143	.224	.342	.532	–	.792	.252	22.120 (9.139)
8.	Non-verbal scores (cognitive ability)	.277	.156	.157	.219	.312	.496	.799	–	.246	21.700 (7.325)
9.	Parental social class	.220	.067	.064	.102	.226	.331	.284	.283	–	3.252 (1.213)
10.	Mean female SD	2.801 (.650)	3.829 (.630)	2.470 (.542)	3.942 (.520)	3.740 (1.279)	2.325 (1.358)	24.150 (8.720)	21.880 (7.211)	3.193 (1.199)	

Note: Values for male ( $n=4,267$ ) are above the diagonal, and values for female ( $n=4,537$ ) are below the diagonal. Standard deviations (SD) are given in parentheses; they were calculated to three decimal places to allow Modeling. Variables were scored such that a higher score indicated greater agreement with the views inherent in the title of the attitude factor, a more professional occupation at age 33, more advanced educational qualifications, a higher verbal and non-verbal cognitive ability scores, and a more professional occupation for the parent.

the data deviate from missing at random and are non-ignorable (Arbuckle, 1996).

2.2.1. Model construction

First we examined the association between childhood mental ability and social attitudes at age 33, the potentially confounding effect of parental social status, and the potentially mediating effects of the person's educational and occupational attainment at age 33. Table 1 presents the correlations, the means and standard deviations of the variables for men and women respectively.

Next, given the gender differences on the scores of the social attitude factors, we tested measurement models for men and women separately, using the four social attitude factors as observed variables to define the latent liberal social attitude variable. Results showed that the path coefficients for factors antiracism, social liberalism, and gender equality ranged from .40 to .66 for men, and .51 to .61 for women. As for the factor political trust, the path coefficients were .07 for men and .05 for women. As mentioned before, political trust also shows relative small associations with the other social attitude factors (Table 1). Therefore, we used the three former factors as observed variables for the latent social liberal attitude variable, and political trust as an independent observed variable for further model testing. This approach was also justified in the light of a specific effect observed by Deary et al. (2008a) regarding the associations between social status and political trust, which was not observed for the three other variables used to identify the latent trait of liberal social attitudes.

Following this, we constructed a structural equation model to test the main hypotheses. The model is intended as an attempt to replicate the model of Deary et al. (2008a) as closely

as possible in a different age cohort and sample, something that is too-rarely done. The verbal and non-verbal tests were used as indicators of a latent trait of general cognitive ability (generally referred to as  $g$ ). The three attitudes factors with relatively strong inter-correlations were used as indicators of a latent trait of general liberal social attitudes, and the remaining attitude factor—political trust—was used separately as an outcome variable in parallel with the latent trait of general liberal social attitudes.

Paths in the model were designed to correspond with the time sequence in which the variables occurred. Thus childhood general cognitive ability and parental social status (which were allowed to correlate) were assumed to influence educational attainment, which in turn influence occupational attainment at age 33, which in turn was hypothesised to influence social attitudes at age 33. Multigroup analysis, using gender as a grouping variable, suggest that there are significant gender differences in the pathways coefficients linking family social background, cognitive ability, and adult outcomes. We thus ran the model for men and women separately (as was done by Deary et al., 2008a), and the results were presented together in Fig. 1. All direct and mediating paths were included in the final models for both men and women.

Fig. 1 shows the structural equation model relating general cognitive ability ( $g$ ) at age 11 to a latent trait of social liberal attitudes and a measured trait of political trust at age 33 in the 1958 National Child Development Study. The usual structural equation Modeling conventions are used, with the latent variable shown as a circle and manifest variables in rectangles. Single headed arrows represent causal influences. The double-headed arrow represents the correlation between independent variables. Dashed lines indicate that the path coefficients are non-significant. Unique and error variance for



and political trust ( $z = 5.575, p < .001$ ). The links appeared to be stronger for men than for women, indicating that the influence of childhood intelligence on political trust among men was mainly mediated through their occupational attainment, whereas for women it had a more direct effect (Fig. 1).

### 3. Discussion

This study examined the links between family social background, childhood intelligence, educational qualifications, occupational attainments, and adults' social attitudes across a number of domains in a large, prospective and population-representative sample. General cognitive ability ( $g$ ) at age 11 was significantly associated with both a latent trait indicating liberal social attitudes (a combination of three social attitude factors—antiracism, social liberalism, and gender equality), and one observed social attitude factor—political trust at age 33. The effect was partly mediated by educational qualifications, though there was also a direct link between  $g$  and general liberal social attitudes and political trust. There was a small mediating effect of  $g$  on liberal social attitudes via the person's own occupational attainment. People who had higher  $g$  scores in childhood and obtained high educational qualifications tend to have more liberal, more tolerant social views across a number of domains, confirming previous findings (Deary et al., 2008a,b; Paterson, 2008; Stubager, 2008). Parental social status had no direct influence on adult people's liberal social attitudes, and only had a small effect on their political trust. People in the lower strata of the social status hierarchy showed less political trust, especially men. These findings are in support of the contention that social class destination is a stronger influence on social attitudes than social origin (Paterson, 2008).

This paper is in part a re-examination of the pathways established among these latent as well as observed variables by Deary et al. (2008a), using a different population of a similar age, but born 12 years earlier. It is rare, but very necessary, to see complex structural equation models replicated in different but comparable samples. Here, this was achieved using almost identical variables, and a large, representative sample. The study confirms the association between childhood intelligence and liberal social attitudes in adulthood. As argued by Deary et al. (2008a) the association between  $g$  and social attitudes might be explained through the role of reasoning processes, i.e. that those with greater cognitive skill are more likely to form open-minded, liberal attitudes, are more likely to read more or to obtain wider cultural exposure. On the other hand, it could be that people with higher cognitive ability might be more likely to endorse attitudes that are considered 'acceptable' by researchers.

Furthermore, the study shows that although childhood intelligence is important for becoming more open-minded and tolerant as adults, education also might play an important role in this association. Childhood intelligence as measured by verbal and non-verbal tests is in part the product of early school education, and childhood cognitive ability and educational qualifications both show a significant direct effect on adult social attitudes. The findings are in line with previous research that emphasizes the importance of early years in cognitive development for a range of outcomes during adolescence and adulthood (Feinstein & Bynner, 2004; Schoon, 2006; Deary et al., 2007). On the other hand, it could be argued that education is a proxy for intelligence, and that we have over-

controlled the model. Yet, although intelligence strongly predicted educational attainment, it did not do so perfectly. Thus it is probably inappropriate either in general or in terms of these data to think of educational attainment only as a proxy for intelligence. It is possible that childhood intelligence functions partly as a spur to the development of other behaviours such as pursuit of education that in turn places people in social contexts and influences their individual perspectives in ways relevant to the formation of social attitudes in adulthood.

The pathways leading to political trust were slightly different than those leading to socially liberal attitudes. The lack of strong associations between childhood intelligence and political trust in this sample may reflect social changes in terms of political agenda, social policy, and the levels of people's general quality of life. It seems that political trust, as a social attitude factor, was as much influenced by parental social class as it was by childhood intelligence, and was to a greater extent mediated through own occupational attainment, especially for men. Gender differences in pathway coefficients, especially regarding the links between  $g$  and occupational attainment and occupational attainment and political trust might be explained by the relatively small number of women aged 33 participating in the labour market (68.7%), compared to men of similar age (92.1%).

The link between social status and people's political views has been well documented in contemporary human history and across different nations. People at the lower level of the social hierarchy are normally financially less well off compared with those who are at higher levels (Weeden et al., 2007), and tend to have less trust in the democratic political system which is meant to provide equality of life chances (Wilkinson & Pickett, 2009). Political trust may be more responsive to social change and current social events compared to general liberal social attitudes, which appear to be more strongly influenced by childhood  $g$  and education, and possibly are more stable for different samples across time.

In interpreting the findings, some strengths and weaknesses of our study have to be considered. The study is based on a large, fairly representative sample of the UK population that was followed from birth into the adult years. Direct measurements of general cognitive ability were taken during childhood, using a validated instrument. The study largely replicates findings from a previous examination of the pathways and processes linking childhood cognitive ability to adult social attitudes (Deary et al., 2008a) in a different large-scale sample of similar age, thus providing crucial evidence on the structure and stability of social attitude formation across time and in different samples. As with all research using cohort studies, this work is constrained by having to make the best use of the available data. Some of the measures used in the analysis are not optimal and stronger associations might have been found if we had measures collected for the specific purpose of this study. Another limitation is the attrition of respondents over time. Non-respondents were about one-third a standard deviation below the responders on childhood intelligence. Accordingly, the findings presented here might be slight underestimates of the population effects because of the range restriction in cognitive ability.

It also has to be considered that social attitudes among the current sample were assessed in 1991, at the height of a major economic recession, while the sample used in the study

by Deary et al. (2008a) reported on their social attitudes in 2001, a period of economic boom and recovery. By 2001 there had been significant changes regarding educational and occupational opportunities, with increasing demand for highly skilled labour, increasing number of cohort members participating in further and higher education, and more women being attached to the labour market (Ferri et al., 2003; Schoon, 2006). Furthermore, the political landscape had changed dramatically, when a Labour government returned to power in 1997 with a parliamentary landslide, ending an 18-year rule of the Conservative party. Despite these differences in the social context, the model developed by Deary et al. (2008a) could be largely replicated among cohort members who were of similar age at the time of the assessments, i.e. in their early 30's, controlling in part for possible age and cohort effects. Although a similar model could be fitted in both cohorts, it might be possible that liberal social attitudes, and in particular political trust, are linked to changes in the socio-historical context and available opportunities for educational and occupational development, as well as changes in individual functioning over time. The study thus reopens the debate regarding individual versus environmental factors in shaping social attitudes.

### Acknowledgements

The analysis and writing of this article were supported by grants from the UK Economic and Social Research Council (ESRC): RES-225-25-2001, and RES-594-28-0001. Data from the Cohort Studies were supplied by the ESRC Data Archive. Those who carried out the original collection of the data bear no responsibility for its further analysis and interpretation. David Batty is a Wellcome Trust Fellow. The UK Medical Research Council and the University of Edinburgh provide core funding for the MRC Centre for Cognitive Ageing and Cognitive Epidemiology which supported the preparation of the present manuscript.

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